

WHAT IS CLAIMED IS:

1 1. A disk recording apparatus for a rewritable optical disk, the disk
2 recording apparatus comprising:
3 a first timing detector having a first timing synchronized with a wobble
4 reproduction signal of the rewritable optical disk;
5 a second timing detector having a second timing synchronized with a track
6 reproduction signal of the rewritable optical disk;
7 a phase difference detector configured to detect a phase difference between the
8 first timing and the second timing; and
9 a controller configured to determine a recording area based on the detected
10 phase difference.

1 2. A disk recording apparatus according to claim 1, wherein the controller
2 is configured to control writing of data on the determined recording area of the optical disk.

1 3. A disk recording apparatus according to claim 1,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;
5 wherein, if $|y| > |w|$ is established as a relationship between the detected
6 phase difference yT and a preset permissible cycle error value wT of a sync signal detected in
7 the track reproduction signal and w is a positive number, the controller is configured to
8 control writing of data on a recording area using a preset reserved area or an empty area on
9 the optical disk; and

10 wherein, if $|y| \leq |w|$ is established, the controller is configured to control
11 writing of data to a target track on the optical disk.

1 4. A disk recording apparatus according to claim 1,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;
5 wherein the controller is configured to employ the detected phase difference to
6 calculate an amount n of error data relative to the track reproduction signal, n being a natural
7 number;

8 wherein, if $n > m$ is established as a relationship between the amount n of error
9 data and a preset permissible amount m of error data, m being a natural number, the
10 controller is configured to control writing of data on a recording area using a preset reserved
11 area or an empty area on the optical disk; and
12 wherein, if $n \leq m$ is established, the controller is configured to control writing
13 of data to a target track on the optical disk.

1 5. A disk recording apparatus according to claim 1, wherein if the
2 controller determines that the recording area for writing the data is a preset reserved area or
3 an empty area on the optical disk, the controller is configured to control the writing of the
4 data using the first timing synchronized with the wobble reproduction signal of the rewritable
5 optical disk.

1 6. A disk recording apparatus according to claim 1,
2 wherein if the controller determines that the recording area for writing the data
3 is a target track on the optical disk, the controller is configured to control a selector to select a
4 recording timing based on the detected phase difference, and to record data on a recording
5 track in accordance with the selected timing;
6 wherein the phase difference between the first timing and the second timing is
7 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
8 length on an optical disk;
9 wherein, if $|y| > |w|$ is established as a relationship between the detected
10 phase difference yT and a preset permissible cycle error value wT of a sync signal detected in
11 the track reproduction signal and w is a positive number, the controller is configured to select
12 the second timing; and
13 wherein, if $|y| \leq |w|$ is established, the controller is configured to select the
14 first timing.

1 7. A disk recording apparatus according to claim 1,
2 wherein if the controller determines that the recording area for writing the data
3 is a target track on the optical disk, the controller is configured to control a selector to select a
4 recording timing based on the detected phase difference, and to record data on a recording
5 track in accordance with the selected timing;

wherein the phase difference between the first timing and the second timing is yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark length on an optical disk;

wherein the controller is configured to employ the detected phase difference to calculate an amount n of error data relative to the track reproduction signal, n being a natural number;

wherein, if $n > m$ is established as a relationship between the amount n of error data and a preset permissible amount m of error data, m being a natural number, the controller is configured to select the second timing; and

wherein, if $n \leq m$ is established, the controller is configured to select the first timing.

8. A disk recording apparatus for a rewritable optical disk, the disk recording apparatus comprising:

a first timing detector having a first timing synchronized with a wobble reproduction signal of the rewritable optical disk;

a second timing detector having a second timing synchronized with a track reproduction signal of the rewritable optical disk;

a phase difference detector configured to detect a phase difference between the first timing and the second timing;

a selector configured to select a timing between the first timing and the second timing; and

a controller configured to control the selector to select the timing based on the detected phase difference, and to record data on a recording track in accordance with the selected timing.

9. A disk recording apparatus according to claim 8,

wherein the phase difference between the first timing and the second timing is yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark length on an optical disk;

wherein, if $|y| > |w|$ is established as a relationship between the detected phase difference yT and a preset permissible cycle error value wT of a sync signal detected in the track reproduction signal and w is a positive number, the controller is configured to select the second timing; and

9 wherein, if $|y| \leq |w|$ is established, the controller is configured to select the
10 first timing.

1 10. A disk recording apparatus according to claim 8,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;
5 wherein the controller is configured to employ the detected phase difference to
6 calculate an amount n of error data relative to the track reproduction signal, n being a natural
7 number;
8 wherein, if $n > m$ is established as a relationship between the amount n of error
9 data and a preset permissible amount m of error data, m being a natural number, the
10 controller is configured to select the second timing; and
11 wherein, if $n \leq m$ is established, the controller is configured to select the first
12 timing.

1 11. A disk recording method for a rewritable optical disk, the method
2 comprising:
3 detecting a phase difference between a first timing synchronized with a
4 wobble reproduction signal of the rewritable optical disk and a second timing synchronized
5 with a track reproduction signal of the rewritable optical disk; and
6 determining a recording area for target data to be written based on the detected
7 phase difference.

1 12. A disk recording method according to claim 11, further comprising
2 controlling the determined recording area to write the target data therein.

1 13. A disk recording method according to claim 11,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;
5 wherein, if $|y| > |w|$ is established as a relationship between the detected
6 phase difference yT and a preset permissible cycle error value wT of a sync signal detected in
7 the track reproduction signal and w is a positive number, the target data is written on a
8 recording area using a preset reserved area or an empty area on the optical disk; and

9 wherein, if $|y| \leq |w|$ is established, the target data is written to a target track
10 on the optical disk.

1 14. A disk recording method according to claim 11,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;

5 further comprising employing the detected phase difference to calculate an
6 amount n of error data relative to the track reproduction signal, n being a natural number;

7 wherein, if $n > m$ is established as a relationship between the amount n of error
8 data and a preset permissible amount m of error data, m being a natural number, the target
9 data is written on a recording area using a preset reserved area or an empty area on the optical
10 disk; and

11 wherein, if $n \leq m$ is established, the target data is written on a target track on
12 the optical disk.

1 15. A disk recording method according to claim 11, wherein if the
2 recording area for the target data to be written is determined to be a preset reserved area or an
3 empty area on the optical disk, controlling the writing of the target data using the first timing
4 synchronized with the wobble reproduction signal of the rewritable optical disk.

1 16. A disk recording method according to claim 11, further comprising, if
2 the recording area for the target data to be written is determined to be a target track on the
3 optical disk, selecting a recording timing between the first timing and the second timing
4 based on the detected phase difference;

5 wherein the phase difference between the first timing and the second timing is
6 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
7 length on an optical disk;

8 wherein, if $|y| > |w|$ is established as a relationship between the detected
9 phase difference yT and a preset permissible cycle error value wT of a sync signal detected in
10 the track reproduction signal and w is a positive number, the second timing is selected as the
11 recording timing; and

12 wherein, if $|y| \leq |w|$ is established, the first timing is selected as the
13 recording timing.

1 17. A disk recording method according to claim 11, further comprising, if
2 the recording area for the target data to be written is determined to be a target track on the
3 optical disk, selecting a recording timing between the first timing and the second timing
4 based on the detected phase difference;

5 wherein the phase difference between the first timing and the second timing is
6 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
7 length on an optical disk;

8 further comprising employing the detected phase difference to calculate an
9 amount n of error data relative to the track reproduction signal, n being a natural number;

10 wherein, if $n > m$ is established as a relationship between the amount n of error
11 data and a preset permissible amount m of error data, m being a natural number, the second
12 timing is selected as the recording timing; and

13 wherein, if $n \leq m$ is established, the first timing is selected as the recording
14 timing.

1 18. A disk recording method for a rewritable optical disk, the method
2 comprising:

3 detecting a phase difference between a first timing synchronized with a
4 wobble reproduction signal of the rewritable optical disk and a second timing synchronized
5 with a track reproduction signal of the rewritable optical disk;

6 selecting a recording timing between the first timing and the second timing
7 based on the detected phase difference; and

8 recording data to the rewritable optical disk in accordance with the selected
9 recording timing.

1 19. A disk recording method according to claim 18,

2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;

5 wherein, if $|y| > |w|$ is established as a relationship between the detected
6 phase difference yT and a preset permissible cycle error value wT of a sync signal detected in
7 the track reproduction signal and w is a positive number, the second timing is selected as the
8 recording timing; and

9 wherein, if $|y| \leq |w|$ is established, the first timing is selected as the
10 recording timing.

1 20. A disk recording method according to claim 18,
2 wherein the phase difference between the first timing and the second timing is
3 yT , y is a positive number, and T is a channel bit which is a basic unit for a recording mark
4 length on an optical disk;

5 further comprising employing the detected phase difference to calculate an
6 amount n of error data relative to the track reproduction signal, n being a natural number;
7 wherein, if $n > m$ is established as a relationship between the amount n of error
8 data and a preset permissible amount m of error data, m being a natural number, the second
9 timing is selected as the recording timing; and

10 wherein, if $n \leq m$ is established, the first timing is selected as the recording
11 timing.